

### Forests are complex systems (open, adaptive)

# ecologically composition

structure: site types, age structure, stand structure, disturbances
 function: nutrient cycling, hydrology, climate effects

#### socially and culturally

## human environment

- function: health, inspiration
  cultural and spiritual legacy
- economically
- wood, non-wood
- employment
   state finance
- state manee



#### CS properties:

- multiple scales connected
- non-linear dynamics
  positive and negative feedbacks
- positive and negative recuback
   evolving, self-organizing

- **Contents:**
- the biodiversity principle in sustainable forest management ideal and reality
- changing biodiversity of Estonian forests
- ... its socio-economic causes and processes comparisons with neighbour countries
- ... the ongoing public debate and solutions national and international dimensions





#### SFM toolbox for biodiversity combining approaches, silvicultural systems,

set-asides

- zoning
  - TRIAD (land sparing + land sharing) green network
    public forests
- combine silvicultural approaches multi-species, multi-purpose
  even-aged + uneven-aged systems
  long- and short-rotation
- multi-scale set-asides retention forestry
  set-asides in managed forests
  - reserves

 no system works everywhere most real systems lack diversity
political mandate needed Identify and add missing cor Ecological Balletins 51: 401-411, 200-Loss of old-growth, and the minimum need for strictly protected forests in Estonia o, Kaupo Kohy, Anneli Palo and Kaili Villm

vation (2019) 28/2965-257 510531 419-41779-4 ۲ g research gaps for national conservation ent and policy: the managers' perspective

Main results:















### Estonia. Background facts.

- SFM an umbrella goal of State Forest Policy (1997)
- Forest land 51% of land area

   even-aged (clear-cutting based) silviculture + retention trees
   TRIAD: 13% forests strictly protected, 11% restrictions
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   State-owned forests 51% of forests
- land reform/re-privatization almost finished
   <100 000 ha before 1919 land reform, > 1 mln ha now
- Private forests (29%) shifting to company-ownership (19%)
- Forest and wood industry ca. 5% of GDP ... but significant in exports >30 000 people involved



















## 1990s started from a green scratch

- political idealism of a young country
- forest stocks accumulated; space both for economic and conservation development opportunistic conservation: EU accession, abandoned military areas
- high-level ecological research
- slow land reform
   privatized: 1993 3%; 1998 15%; 2007 44%; 2018 48%
- urgency to export -> state forest certification (2002)













## Political mandate to Forestry Development Plan until 2030

- to be submitted in spring 2020

   101 problems defined democratically (2018)
   solution processes failing due lack of co-operation (2019)

   key issues by industrial policy coalition

   increasing wood production "for climate"
   compensations for forest protection
   key issues by socio-ecological coalition
- reducing logging volumes re-organizing State Forest Management Centre for socio-ecological goals protecting valuable forest sites landscape planning









## Social-ecological traps?

Conservation Letters (Conservation Letters) Conservation Latters, Invol. 1-13 Terror A Review of Social Dilemmas and Social-Ecological Traps in Conservation and Natural Resource Management

- innovation risk: unsustainable industry locking-in 3%-5% annual growth in wood consumption expected "there is no alternative" -> locks-in conservation
- governance risk: MoE responsible for SFM but rejects criticism locks-in untrust and 'counter-culture'
- knowledge base risk complex system treated by (selected) parts burden-of-proof and precautionary approaches unclear

## Conclusions

- SFM is a framework that acknowledges forest complexity must be addressed through fair social procedures
- Estonian forests have entered another biodiversity decline conservation is better prepared: reserves, retention, knowledge, SFM targets
- the pressure comes primarily from exporting industry masked with a discussion on property rights
- the risk is to lose SFM approach in a socio-ecological trap re-newed social contract and international co-work for SFM could help